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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,743	05/01/2001	Thomas P. Feist	08CN0S803A	3681

23413 7590 05/26/2004

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EXAMINER	
BERNATZ, KEVIN M	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 05/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/845,743	FEIST ET AL.	
	Examiner	Art Unit	
	Kevin M Bernatz	1773	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-75 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-75 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

2. Upon reconsideration and partly in view of applicants' arguments in the Appeal Brief of March 24, 2004, the finality of the rejection of November 19, 2003 is withdrawn and prosecution reopened. The Examiner apologizes for the inconvenience caused by the necessity of the reopening of prosecution. An office action on the merits follows below.

3. The Examiner notes that applicants have claimed three main embodiments: independent claims 1, 30 and 56. All the claims have been rejected in view of Landin et al. ('774) and the order of the rejections is such that the embodiments are addressed in order from broadest (claim 56) to narrowest (claim 1). The Examiner wishes to call applicants attention to this fact since the claims will not necessarily be referred to in numerical order since some of the dependent claims possess similar limitations to dependent claims of the other main embodiments.

Claim Objections

4. Claims 30 – 55 and 74 are objected to because of the following informalities: independent claim 30 claims "a substrate comprising ... an areal density of about 10 Gbit/in^2", yet the Examiner notes that the areal recording density is not a property of the *substrate*, but of the medium (i.e. the substrate alone is non-magnetic, so has a recording density of 0). Applicants' are suggested to reword the claim to clarify that it is the *medium* which possesses "an areal density of about 10 Gbit/in^2".

In addition, the Examiner notes that the areal recording density of a medium is not a positive limitation, in so far as it applies to just the medium. Specifically, while the substrate affects the recording density (*Annacone et al., col. 1, lines 28 – 31; and Tenhover et al., col. 3, lines 5 - 10*), there are many additional parameters such as the head-disk spacing (*Annacone et al., col. 1, lines 38 – 48; and Tenhover et al., col. 1, lines 48 – 56*), magnetic layer thickness, coercivity, crystalline texture (*Tenhover et al., col. 1, lines 48 – 56*) and the type of magnetic layer used (*Guha et al., col. 1, lines 23 – 57; col. 2, lines 42 – 67; col. 3, lines 5 – 22; and col. 5, lines 33 – 45*). The Examiner notes recording densities of over 100 Gbit/in^2, even up to 400 Gbit/in^2 are known at the time of applicants' invention (*Guha et al., ibid*). As such, the areal recording density is only a positive limitation in so far as an apparatus claim is concerned, wherein the disk *and* head are positively recited. Presently, the claims are directed only to a magnetic storage medium, and are not directed to an apparatus comprising both the medium and a read/write head. For purposes of evaluating the prior art, the Examiner has interpreted this limitation as it impacts the structure of the medium, specifically the

medium *in it's entirety must be capable of achieving* the claimed areal recording density regardless of the relative head-disk spacing.

Claim Rejections - 35 USC § 102

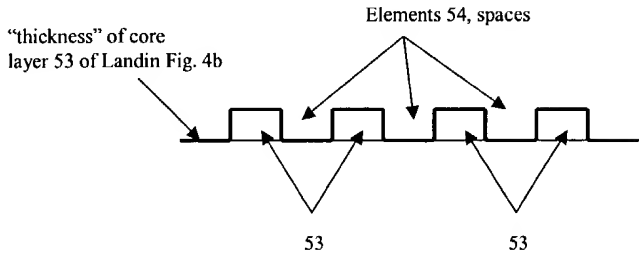
5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 56, 58 – 70 are rejected under 35 U.S.C. 102(b) as being anticipated by Landin et al. ('774).

Regarding claim 56, Landin et al. disclose a data storage media (*Title*) comprising a substrate comprising at least one plastic resin portion (*Figure 2, element 4a*) and a core (*element 8*), wherein said core further comprises varied thickness (*Figure 4b, elements 53 and 54 – alternating filled and hollow cavities are "varied thickness" – see Figure 1 below*) and at least one data layer disposed on said substrate (*element 6a*).

Figure 1: Illustration of "varied thickness" of damping core of Landin et al.



Regarding claim 58 - 60, 61, 63 and 64, Landin et al. disclose cores meeting applicants' claimed diameter limitations (*Figure 2*), ring-shaped limitations (*Figure 4*), hollow cavity limitations (*Figure 4b, elements 54*) and filled cavity limitations (i.e. cores with multiple portions comprising different materials) (*Figure 4a, elements 33 and 35*). See also col. 9, line 30 bridging col. 10, line10 for the description of Figures 2 – 4.

Regarding claim 62, Landin et al. disclose the filled cavity being formed of materials meeting applicants' claimed limitations (*col. 6, lines 42 – 67 and col. 9, lines 56 – 67*)

Regarding claims 65 and 66, the limitation(s) "preformed" and "formed in situ with said substrate"", the Examiner notes that these limitation(s) are/(is a) process limitation(s) and is/are not further limiting in terms of the structure resulting from the claimed process. Specifically, in a product claim, as long as the prior art product meets the claimed structural limitations, the method by which the product is formed is not germane to the determination of patentability of the product unless an unobvious difference can be shown to result from the claimed process limitations. In the instant case, whether the core is formed *in situ* or preformed does not change the final

structure of the product, namely a composite substrate comprising a core surrounded by a plastic resin portion.

Regarding claims 67 and 68, the phrase "consisting essentially of plastic" has been interpreted as defined in the Final Office Action mailed November 19, 2003. Regardless, the Examiner notes that Landin et al. disclose a substrate consisting essentially of plastic, i.e. core and plastic resin portion are taught to be a plastic materials meeting applicants' claimed limitations (*col. 5, lines 58 – 64 and col. 6, lines 42 – 67*).

Regarding claims 69 and 70, Landin et al. disclose reinforcements meeting applicants' claimed limitations (*col. 7, lines 23 – 66*).

Claim Rejections - 35 USC § 103

7. Claims 30, 31, 34 – 40, 42 and 44 – 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) as applied above, and further in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015).

Regarding claims 30, 31 and 34, Landin et al. disclose a data storage media comprising a substrate comprising at least one plastic portion and at least one data layer on said substrate as described above in Paragraph 6.

Landin et al. further disclose wherein said data layer can be at least partly read from, written to, or a combination thereof by at least one energy field (i.e. optical, magnetic or magneto-optical) (*col. 3, lines 1 – 8 and col. 11, lines 12 - 19*) and wherein when the energy field contacts said storage media, said energy field is incident upon

said data layer before it could be incident upon said substrate (*Figure 2, layers 4a, 4b, 6a, 6b and 8*).

Regarding the limitation of "an areal density of about 10 Gbit/in^2", the Examiner notes the Guha et al. cited above and Sandstrom (*col. 3, lines 51 – 57 and col. 9, lines 35 – 38*) both teach that forming recording media capable of possessing areal recording densities of about 10 Gbit/in^2 or higher is within the knowledge of one of ordinary skill in the art and the disclosed substrates are deemed to be capable of obtaining the claimed recording density depending on the choice of magnetic layers and the type/spacing of magnetic head used, especially given the teachings in Guha et al. regarding the effect on areal recording density based on the choice of magnetic layer material.

Regarding the limitation(s) "axial displacement peak ... under shock or vibration excitation", the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111.

Specifically, the axial displacement peak is the displacement of the medium measured in the peak-to-peak amplitude when a force or excitation is applied to the disk. I.e. the extent of height variations due to vibrations from the shock or vibration excitation (*see Paragraphs 0032, 0033, 0044 and 0113*). The examiner notes that presently the claims do not recite under which magnitude of shock or vibration. The Examiner further notes that applicants' admit that the axial displacement peak is not a

function solely of the media and that the "axial displacement can be reduced by utilizing a vibration damping material in the restraining device, or clamping structure, that holds the substrate (*Paragraphs 0044 and 0113*).

Landin et la. fails to teach an explicit measurement of the axial displacement or surface roughness, though Landin et al. recognizes the importance of reducing the vibration and shock effects that occur in a storage medium (*col. 1, lines 28 – 41*).

However, Sandstrom and Zou et al. provide explicit teachings to control the axial displacement to values meeting applicants' claimed ranges inorder to reduce the occurrence of head slap and insure good read/write properties of the medium (*Sandstrom, Figure 4; col. 2, lines 20 – 35; col. 2, line 63 bridging col. 3, line 18; col. 3, line 30 bridging col. 4, line 14; and col. 10, line 27 bridging col. 11, line 51; and Zou et al., col. 1, lines 39 – 43; col. 4, line 61 bridging col. 5, line 5; and Figure 1*).

Zou et al. further teach that the surface roughness should be controlled to within applicants' claimed range because such a surface "reduces a space between the magnetic head and the magnetic disc, thereby enhancing the recording density as an advantage" (*col. 5, lines 44 – 58*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. to possess an axial displacement peak under shock or vibration excitation and a surface roughness meeting applicants' claimed magnitudes as taught by Sandstrom and Zou et al. inorder to reduce the occurrence of head slap, insure good read/write properties of the medium, and to

reduce a space between the magnetic head and the magnetic disc, thereby enhancing the recording density.

Regarding claims 35 and 36, the Examiner notes that the mechanical damping coefficient is defined as the loss modulus divided by the storage modulus (*applicants' specification, Paragraph 40*), which is identical to what Landin et al. calls the "loss factor" (*col. 6, lines 12 – 31*). Landin et al. further teaches that materials with a high damping value, i.e. high value of the loss factor, ("most preferably about 1 – 10") (*ibid*), should be used inorder to improve the damping properties (i.e. loss values) of the entire substrate (*col. 5, lines 31 – 42*). It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. to use a substrate possessing large loss factors (i.e. "mechanical damping coefficient") meeting applicants' claimed limitations as taught by Landin et al., since the larger the mechanical damping coefficient of the substrate, the more resistant the substrate will be to shock or vibration (*col. 4, lines 45 – 67*).

Regarding claims 39, 40 and 42 – 50, Landin et al. is relied upon as described above in Paragraph 6.

8. Claims 1 – 6, 11, 14, 15, 17 – 27, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) as applied above, and further in view of O'Hollaren et al. (U.S. Patent No. 6,154,438).

Landin et al., Guha et al., Sandstrom and Zou et al. are relied upon as described above.

Regarding claims 1 – 3, 32 and 33, none of the above disclose an edge lift height meeting applicants' claimed magnitudes. The Examiner notes that the edge lift height is the "lip" or "ski-jump" commonly formed at the exterior diameter of a disk substrate (*applicants' specification, Paragraph 0036*).

However, O'Hollaren et al. teach that it is known in the art to reduce the edge lift height to applicants' claimed magnitude or less inorder to allow for more of the surface of the disk to be used for recording, and hence a greater recording density (*col. 1, lines 14 – 16 and lines 47 – 67; col. 2, lines 16 – 25; col. 15, lines 36 – 39; col. 15, line 64 bridging col. 16, line 22; and col. 16, line 55 bridging col. 17, line 2*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. in view of Guha et al., Sandstrom and Zou et al. to further include an edge lift height meeting applicants' claimed magnitudes as taught by O'Hollaren et al. since by reducing or eliminating the edge lift height more of the surface of the disk to be used for recording, and hence a greater recording density can be achieved.

Regarding claims 4 – 6; 14, 15 and 17 – 27, Landin et al., Guha et al., Sandstrom and Zou et al. are relied upon as described above in Paragraph 7.

Regarding claim 11, Landin et al. disclose a resonant frequency of the substrate meeting applicants' claimed magnitude (*col. 12, lines 18 – 26 and Table 1*).

9. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. as applied above in Paragraph 6, and further in view of Yamaguchi (DE 43-26296 A1). See provided English Translation of DE '296 A1.

Landin et al. is relied upon as described above.

Landin et al. fail to teach a substrate core meeting applicants' claimed shape limitations.

However, Yamaguchi teaches forming substrates, including the cores and any layers deposited on them, such that they meet applicants' claimed shape limitations inorder to make the disks lighter and to allow for easy insertion into stacked disk drives (*page 7, lines 5 – 8 and lines 16 – 20; page 8, lines 1 – 8; page 11, lines 2 – 9; and Figures 3, 5, 7, 9 and 11*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. to use a core structure meeting applicants' claimed limitations as taught by Yamaguchi since such a shape allows the disks to be lighter and allows for easier insertion into stacked disk drives.

10. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) as applied above in Paragraph 7, and further in view of Yamaguchi (DE 43-26296 A1). See provided English Translation of DE '296 A1.

Landin et al., Guha et al., Sandstrom and Zou et al. are relied upon as described above.

None of the above teach a substrate core meeting applicants' claimed shape limitations.

However, Yamaguchi teaches forming substrates, including the cores and any layers deposited on them, such that they meet applicants' claimed shape limitations inorder to make the disks lighter and to allow for easy insertion into stacked disk drives (*page 7, lines 5 – 8 and lines 16 – 20; page 8, lines 1 – 8; page 11, lines 2 – 9; and Figures 3, 5, 7, 9 and 11*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. in view of Guha et al., Sandstrom and Zou et al. to use a core structure meeting applicants' claimed limitations as taught by Yamaguchi since such a shape allows the disks to be lighter and allows for easier insertion into stacked disk drives.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) as applied above in Paragraph 8, and further in view of Yamaguchi (DE 43-26296 A1). See provided English Translation of DE '296 A1.

Landin et al., Guha et al., Sandstrom, Zou et al. and O'Hollaren et al. are relied upon as described above.

None of the above teach a substrate core meeting applicants' claimed shape limitations.

However, Yamaguchi teaches forming substrates, including the cores and any layers deposited on them, such that they meet applicants' claimed shape limitations inorder to make the disks lighter and to allow for easy insertion into stacked disk drives (*page 7, lines 5 – 8 and lines 16 – 20; page 8, lines 1 – 8; page 11, lines 2 – 9; and Figures 3, 5, 7, 9 and 11*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) to use a core structure meeting applicants' claimed limitations as taught by Yamaguchi since such a shape allows the disks to be lighter and allows for easier insertion into stacked disk drives.

12. Claims 71 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. as applied above in Paragraph 6, and further in view of Wu et al. ('422).

Landin et al. is relied upon as described above.

Landin et al. fail to teach a coercivity of the magnetic layer meeting applicants' claimed magnitudes.

However, Wu et al. teach that coercivities meeting applicants' claimed limitations are necessary for improved recording density (*Figure 4A and col. 4, lines 10 – 26*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. to use a magnetic layer meeting applicants' claimed coercivity limitations as taught by Wu et al. inorder to achieve improved recording density.

13. Claims 54 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) as applied above in Paragraph 7, and further in view of Wu et al. ('422).

Landin et al., Guha et al., Sandstrom and Zou et al. are relied upon as described above.

None of the above teach a coercivity of the magnetic layer meeting applicants' claimed magnitudes.

However, Wu et al. teach that coercivities meeting applicants' claimed limitations are necessary for improved recording density (*Figure 4A and col. 4, lines 10 – 26*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) to use a magnetic layer meeting applicants' claimed coercivity limitations as taught by Wu et al. inorder to achieve improved recording density.

14. Claims 29 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) as applied above in Paragraph 8, and further in view of Wu et al. ('422).

Landin et al., Guha et al., Sandstrom, Zou et al. and O'Hollaren et al. are relied upon as described above.

None of the above teach a coercivity of the magnetic layer meeting applicants' claimed magnitudes.

However, Wu et al. teach that coercivities meeting applicants' claimed limitations are necessary for improved recording density (*Figure 4A and col. 4, lines 10 – 26*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) to use a magnetic layer meeting applicants' claimed coercivity limitations as taught by Wu et al. inorder to achieve improved recording density.

15. Claim 75 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. as applied above in Paragraph 6, and further in view of Lazzari ('967).

Landin et al. is relied upon as described above.

Landin et al. fail to teach a substrate comprising a plastic portion comprising pits and grooves.

However, Lazzari teaches that one can form pits and grooves in a substrate "in order to bring about a good separation of the recording tracks, which has the advantage of reducing crosstalk" (*col. 3, line 20 bridging col. 4, line 2 and Figure 4*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. to use a substrate meeting applicants' claimed limitations as taught by Lazzari inorder to "bring about a good separation of the recording tracks, which has the advantage of reducing crosstalk".

16. Claim 74 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) as applied above in Paragraph 7, and further in view of Lazzari ('967).

Landin et al., Guha et al., Sandstrom and Zou et al. are relied upon as described above.

None of the above teach a substrate comprising a plastic portion comprising pits and grooves.

However, Lazzari teaches that one can form pits and grooves in a substrate "in order to bring about a good separation of the recording tracks, which has the advantage of reducing crosstalk" (*col. 3, line 20 bridging col. 4, line 2 and Figure 4*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) to use a

substrate meeting applicants' claimed limitations as taught by Lazzari inorder to "bring about a good separation of the recording tracks, which has the advantage of reducing crosstalk".

17. Claim 73 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) as applied above in Paragraph 8, and further in view of Lazzari ('967).

Landin et al., Guha et al., Sandstrom, Zou et al. and O'Hollaren et al. are relied upon as described above.

None of the above teach a substrate comprising a plastic portion comprising pits and grooves.

However, Lazzari teaches that one can form pits and grooves in a substrate "in order to bring about a good separation of the recording tracks, which has the advantage of reducing crosstalk" (*col. 3, line 20 bridging col. 4, line 2 and Figure 4*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) to use a substrate meeting applicants' claimed limitations as taught by Lazzari inorder to "bring about a good separation of the recording tracks, which has the advantage of reducing crosstalk".

18. Claims 51 – 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) as applied above in Paragraph 7, and further in view of Bonnebat et al. ('020) and Nigam et al. (U.S. Patent No. 5,968,627).

Landin et al., Guha et al., Sandstrom and Zou et al. are relied upon as described above.

None of the above teach a moment of inertia meeting applicants' claimed magnitude limitations.

However, Bonnebat et al. and Nigam et al. teach that low moment of inertia substrates are desired inorder to reduce spin-up times during disk start-up and lower power consumption (*Bonnebat et al. - col. 1, lines 45 – 46; col. 2, lines 23 – 30 and col. 4, lines 4 – 14; Nigam et al., col. 11, lines 38 – 46*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) to minimize the substrates moment of inertia per the teachings of Bonnebat et al. and Nigam et al. inorder to reduce spin-up times during disk start-up and lower power consumption.

19. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et

al. ('015) and O'Hollaren et al. ('428) as applied above in Paragraph 8, and further in view of Bonnebat et al. ('020) and Nigam et al. (U.S. Patent No. 5,968,627).

Landin et al., Guha et al., Sandstrom, Zou et al. and O'Hollaren et al. are relied upon as described above.

None of the above teach a moment of inertia meeting applicants' claimed magnitude limitations.

However, Bonnebat et al. and Nigam et al. teach that low moment of inertia substrates are desired inorder to reduce spin-up times during disk start-up and lower power consumption (*Bonnebat et al. - col. 1, lines 45 – 46; col. 2, lines 23 – 30 and col. 4, lines 4 – 14; Nigam et al., col. 11, lines 38 – 46*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) to minimize the substrates moment of inertia per the teachings of Bonnebat et al. and Nigam et al. inorder to reduce spin-up times during disk start-up and lower power consumption.

20. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) as applied above in Paragraph 7, and further in view of Bonnebat et al. ('020).

Landin et al., Guha et al., Sandstrom and Zou et al. are relied upon as described above.

None of the above teach a radial and tangential tilt meeting applicants' claimed magnitude.

However, Sandstrom, Zou et al. and Bonnebat et al. all teach the importance of minimizing the tilt in all directions inorder to insure "a more consistent air gap thickness between the recording head and the surface of the disk" (*Sandstrom – Figure 3; col. 2, liens 20 – 35; col. 2, line 63 bridging col. 3, line 18; col. 3, line 30 bridging col. 4, line 14; and col. 9, line 44 bridging col. 10, line 26; see also Zou et al. – col. 1, lines 39 – 43; and Bonnebat et al. – Figure 1; col. 4, lines 4 – 14; col. 8, lines 48 – 62; and examples*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) to possess a radial and tangential tilt meeting applicants' claimed limitations as taught by Sandstrom, Zou et al. and Bonnebat et al. inorder to insure "a more consistent air gap thickness between the recording head and the surface of the disk".

21. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) as applied above in Paragraph 8, and further in view of Bonnebat et al. ('020).

Landin et al., Guha et al., Sandstrom, Zou et al. and O'Hollaren et al. are relied upon as described above.

None of the above teach a radial and tangential tilt meeting applicants' claimed magnitude.

However, Sandstrom, Zou et al. and Bonnebat et al. all teach the importance of minimizing the tilt in all directions inorder to insure "a more consistent air gap thickness between the recording head and the surface of the disk" (*Sandstrom – Figure 3; col. 2, liens 20 – 35; col. 2, line 63 bridging col. 3, line 18; col. 3, line 30 bridging col. 4, line 14; and col. 9, line 44 bridging col. 10, line 26; see also Zou et al. – col. 1, lines 39 – 43; and Bonnebat et al. – Figure 1; col. 4, lines 4 – 14; col. 8, lines 48 – 62; and examples*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) to possess a radial and tangential tilt meeting applicants' claimed limitations as taught by Sandstrom, Zou et al. and Bonnebat et al. inorder to insure "a more consistent air gap thickness between the recording head and the surface of the disk".

22. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) as applied above in Paragraph 7, and further in view of Bonnebat et al.

('020), Ito et al. (WO 98/42493), and Yotsuya et al. (U.S. Patent No. 6,335,843 B2). See U.S. Patent No. 6,096,419 which is the U.S. Equivalent of PCT WO98/42493.

Landin et al., Guha et al., Sandstrom and Zou et al. are relied upon as described above.

None of the above teach a moisture content which varies according to applicants' claimed limitations.

However, Bonnebat et al., Ito et al. and Yotsuya et al. teach that it is important for the substrate to possess a "high dimensional stability with regard to temperature or moisture" (*Bonnebat et al., col. 1, lines 42 – 44; col. 2, lines 55 – 59; and col. 12, lines 36 – 44*), including resistance to moisture absorption since "the lower the moisture absorption rate, the smaller the change in size ... so that electromagnetic transducing ability holds high" (*Ito et al., col. 4, lines 8 – 14*) and sticking between the head and magnetic disc due to moisture is avoided (*Yotsuya et al. – col. 1, lines 34 – 40*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461) and Zou et al. ('015) to possess a moisture content which varies according to applicants' claimed limitation as taught by Bonnebat et al., Ito et al. and Yotsuya et al. since it is important for the substrate to possess a "high dimensional stability with regard to temperature or moisture", including resistance to moisture absorption since "the lower the moisture absorption rate, the smaller the change in size ... so that electromagnetic transducing

ability holds high" and sticking between the head and magnetic disc due to moisture is avoided.

23. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) as applied above in Paragraph 8, and further in view of Bonnebat et al. ('020), Ito et al. (WO 98/42493), and Yotsuya et al. (U.S. Patent No. 6,335,843 B2). See U.S. Patent No. 6,096,419 which is the U.S. Equivalent of PCT WO98/42493.

Landin et al., Guha et al., Sandstrom, Zou et al. and O'Hollaren et al. are relied upon as described above.

None of the above teach a moisture content which varies according to applicants' claimed limitations.

However, Bonnebat et al., Ito et al. and Yotsuya et al. teach that it is important for the substrate to possess a "high dimensional stability with regard to temperature or moisture" (*Bonnebat et al., col. 1, lines 42 – 44; col. 2, lines 55 – 59; and col. 12, lines 36 – 44*), including resistance to moisture absorption since "the lower the moisture absorption rate, the smaller the change in size ... so that electromagnetic transducing ability holds high" (*Ito et al., col. 4, lines 8 – 14*) and sticking between the head and magnetic disc due to moisture is avoided (*Yotsuya et al. – col. 1, lines 34 – 40*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of

Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) to possess a moisture content which varies according to applicants' claimed limitation as taught by Bonnebat et al., Ito et al. and Yotsuya et al. since it is important for the substrate to possess a "high dimensional stability with regard to temperature or moisture", including resistance to moisture absorption since "the lower the moisture absorption rate, the smaller the change in size ... so that electromagnetic transducing ability holds high" and sticking between the head and magnetic disc due to moisture is avoided.

24. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015), O'Hollaren et al. ('428), Bonnebat et al. ('020) and Nigam et al. (U.S. Patent No. 5,968,627) as applied above in Paragraph 19, and further in view of Fujita et al. (U.S. Patent No. 4,870,429).

Landin et al., Guha et al., Sandstrom, Zou et al., O'Hollaren et al., Bonnebat et al. and Nigam et al. are relied upon as described above.

None of the above teach a substrate possessing a specific gravity meeting applicants' claimed magnitude.

However, Fujita et al. teach using a foamed damping material versus the solid viscoelastic damping material used by Landin et al. to reduce the weight of the substrate (*col. 1, lines 39 – 61; col. 1, line 66 bridging col. 2, line 2; col. 2, lines 62 – 68; and examples*), and the Examiner notes that the specific gravity (i.e. density) of the

substrate is dependent on the overall densities and percentages of all the materials forming the substrate. The Examiner further notes that the specific gravity directly impacts the moment of inertia (*Bonnebat et al., col. 1, lines 45 – 46 and col. 2, lines 23 – 30*) and one of ordinary skill in the art would have been motivated to reduce the specific gravity per the teachings of Fujita et al. inorder to reduce the moment of inertia inorder to reduce spin-up times during disk start-up and lower power consumption (*Nigam et al., col. 11, lines 38 – 46 and Bonnebat et al., col. 4, lines 4 – 14*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015), O'Hollaren et al. ('428), Bonnebat et al. ('020) and Nigam et al. (U.S. Patent No. 5,968,627) to possess a minimized specific gravity meeting applicants' claimed limitations as taught by Fujita et al., Bonnebat et al. and Nigam et al. inorder to reduce the moment of inertia inorder to reduce spin-up times during disk start-up and lower power consumption.

25. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) as applied above in Paragraph 8, and further in view of Kuromiya et a. ('989), Oniki et al. ('083) and Miyake et al. ('159).

Landin et al., Guha et al., Sandstrom, Zou et al. and O'Hollaren et al. are relied upon as described above.

None of the above teach modal frequencies meeting applicants' claimed limitations.

However, Kuromiya et al., Oniki et al. and Miyake et al. all teach that one of ordinary skill in the art would have been motivated to produce a disk with no resonance/modal frequencies below the operating frequency range inorder to "provide a magnetic disc substrate capable of tracking with high precision" (*Kuromiya et al. - col. 1, lines 11 – 25; col. 1, line 61 bridging col. 2, line 11; and Tables; Oniki et al. - col. 3, lines 63 – 67; and Miyake et al. – col. 1, line 65 bridging col. 2, line 8; col. 2, lines 23 – 44; and col. 4, lines 1 – 29*).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Landin et al. ('774) in view of Guha et al. (U.S. Patent No. 6,146,755), Sandstrom ('461), Zou et al. ('015) and O'Hollaren et al. ('428) to possess resonance/modal frequencies meeting applicants' claimed limitations as taught by Kuromiya et al., Oniki et al. and Miyake et al. inorder to "provide a magnetic disc substrate capable of tracking with high precision".

Response to Arguments

26. The rejection of claims 1 - 75 under 35 U.S.C § 102(b) and/or 103(a) – Landin et al., alone or in combination with various references

Applicant(s) arguments in the Appeal Brief filed March 24, 2004 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (571) 272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
May 19, 2004

Paul Thibodeau

Supervisory Patent Examiner
Technology Center 1700